

In the Claims:

1. (original) A process comprising the steps of
mixing particles of a metal powder with a lubricant having a characteristic of becoming liquid under pressure and of evaporating under a sintering temperature and at least one liquid phase former to form a mixture;
compressing the mixture at a pressure sufficient to liquefy and uniformly distribute the lubricant within the compressed mixture with said lubricant effecting a uniform distribution of said liquid phase former on said particles of metal powder; and
sintering the compressed mixture at a sintering temperature sufficient to evaporate and drive off said lubricant and to effect a liquid phase sintering of said liquid phase former with said particles of metal powder to obtain a compressed and sintered product having a density of 99+% of theoretical density.
2. (original) A process as set forth in claim 1 wherein said metal powder is a ferrous metal powder.
3. (original) A process as set forth in claim 1 wherein said lubricant is one of APEX PS1000b, lauric acid and Johnson's Floor Wax.
4. (original) A process as set forth in claim 1 wherein said liquid phase former is at least one of synthetic graphite, nickel, boron, phosphorous and compounds of boron and phosphorous.
5. (original) A process as set forth in claim 1 wherein said mixture is compressed under a compaction pressure of 35 to 70 tons per square inch.
6. (original) A process as set forth in claim 1 wherein said mixture is compressed through high velocity compaction.

7. (original) A process as set forth in claim 1 wherein said mixture is compressed under a compaction pressure greater than 45 tons per square inch.
8. (original) A process as set forth in claim 1 wherein said compressed mixture is sintered at a temperature in the range of from 2070 to 2500° with the preferred range being 2300 to 2500 F.
9. (original) A process as set forth in claim 1 wherein said compressed mixture is sintered at a temperature in the range of from 2300 to 2500° for a time of from 10 to 60 minutes.
10. (original) A process as set forth in claim 1 wherein said step of compressing includes placement of the mixture in a tool whereby during compressing of the mixture into a green compact the liquefied lubricant forms a liquid film between the tool and the mixture to cause a green compact with a uniform density gradient to be obtained.
11. (original) A product made in accordance with the process of claim 1.
12. (original) A powder metal product having a density of 99+% of theoretical.
13. (original) A powder metal product as set forth in claim 12 having a uniform density gradient throughout the product.
14. (original) A powder metal product as set forth in claim 12 characterized in being formed of at least one of iron and low alloy steel finer than 100 mesh and a liquid phase former having a characteristic of forming a liquid phase during sintering and of becoming part of the final product after sintering.
15. (currently amended) A powder metal product as set forth in claim 14 characterized in that said liquid phase former is includes at least one of nickel, phosphorous, boron, a compound of boron and a compound of phosphorous and is finer than 20 microns.

16. (currently amended) A powder metal product as set forth in claim 14 characterized in that said liquid phase former is includes at least one of nickel, phosphorous, boron, a compound of boron and a compound of phosphorous and is finer than 10 microns.

17. (original) A powder metal product as set forth in claim 14 characterized in that said liquid phase former is synthetic graphite and is finer than 10 microns.

18. (original) A powder metal product as set forth in claim 14 characterized in that said liquid phase former is synthetic graphite and is finer than 2 microns.

19. (currently amended) A powder mixture comprising

solid particles of at least one of a pure metal, an alloy and a co-diffused material;
a lubricant; and

at least one liquid phase former ~~including synthetic graphite~~ having a characteristic of forming a liquid phase during sintering and of becoming part of the final product after sintering.

20. (previously added) A powder mixture as set forth in claim 19 wherein said solid particles are a ferrous metal powder.

21. (previously added) A powder mixture as set forth in claim 20 wherein said ferrous metal powder is at least one of iron and low alloy steel finer than 100 mesh.

22. (previously added) A powder mixture as set forth in claim 20 wherein said lubricant is one of APEX PS1000b, lauric acid and Johnson's Floor Wax.

23. (currently amended) A powder mixture as set forth in claim 20 wherein said liquid phase former ~~further~~ includes at least one of synthetic graphite, nickel, boron, phosphorous and compounds of boron and phosphorous.

24. (previously added) A powder mixture as set forth in claim 19 wherein said synthetic graphite is finer than 10 microns.